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THE INTEREST OF THE YOUNGER GENERATION IN GROUPER FARMING IN LEMBUNG VILLAGE, GALIS DISTRICT, PAMEKASAN REGENCY

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Abstract. Aging farmers and aging fishers pose a challenge to Indonesia's agriculture and fisheries sector. Without regeneration, the economy, employment, and food security will be threatened. Aquaculture, such as grouper farming in Pamekasan Regency, is one of the fisheries sectors with good prospects. This research aims to assess the level of interest among the youth in grouper farming in Lembung Village, Galis Sub-district, Pamekasan Regency and identify factors that influence their interest. The respondents in this research were 30 youth aged 16-30 years who were purposefully determined. Primary data were collected by interview and observation and analyzed by quantitative descriptive analysis and multiple linear regression. The results showed that the level of youth interest in cantang grouper aquaculture in Lembung Village, Galis Sub-district, Pamekasan Regency was in the medium category. This interest is influenced by motivational factors. It requires steps to continuously increase the interest of the youth in cantang grouper aquaculture through government and community cooperation. Government support can be in the form of training, counseling, and capital access assistance. In addition, strengthening groups of cultivators to guide and share experiences with the youth is highly necessary.

Keywords: aging farmer, aquaculture, fisheries, motivation, youth

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INTRODUCTION

Aging farmers present a significant challenge in the current agricultural sector. Over the past decade, agricultural census data have shown a steady rise in the average age of Indonesian farmers. In 2013, the average age was 45 years old, increasing to 55 years by 2023. Farmers aged between 25 and 35 make up only 12.29% of the total 24,160,685 farmers in Indonesia, while older farmers dominate the remainder (Badan Pusat Statistik, 2019). The agricultural sector is often perceived by a significant portion of the younger generation as lacking in appeal. It is frequently associated with physically demanding work under intense sunlight and constrained by the limited availability of arable land (Susilowati, 2016). The phenomenon of aging farmers, if not addressed through effective generational

renewal, may pose substantial risks to Indonesia's national economy, labor market, and food security (Yuniarti Sukarniati, 2021).

The aging farmer phenomenon refers to the decline in the number of young farmers, accompanied by a growing proportion of older farmers within the agricultural workforce (Yuniarti & Sukarniati, 2021). Currently, most of the agricultural workforce consists of farmers aged 45 years old and above. This phenomenon is largely attributed to the lack of interest among the younger generation in pursuing farming as a profession (Susilowati, 2016). The aging farmer phenomenon is also evident in Australia, where most farmers are over the age of 65 years old (Susilowati, 2016). Several other studies indicate that the average age of farmers in the United States and Europe is 57 and 65 years old, respectively (Zagata & Sutherland, 2015).

The aging farmer phenomenon is likewise evident among traditional fishermen. The low interest of the younger generation in pursuing careers as farmers or fishermen constitutes a major factor hindering the regeneration of the agricultural and fisheries sectors (Riastyanto et al., 2021). The decline in physical ability and health among aging farmers and fishermen, compounded by their limited capacity to adapt to technological changes, further intensifies this phenomenon. Younger generations tend to prefer occupations outside the agricultural sector, both in rural and urban areas (Pinem et al., 2020). The availability of employment and entrepreneurial opportunities in other sectors has also contributed to the declining interest of younger generations in pursuing a career as a fish farmer (Sahuleka et al., 2020).

The aging of the traditional fisherman population, resulting from the insufficient participation of the younger generation, poses a potential threat to the future productivity and sustainability of the fisheries sector (Majid, 2023). As fishermen age, they experience a decline in stamina, strength, and physical endurance (Ermayanti, 2014). This condition may limit fishermen's ability to perform physically strenuous activities associated with fishing. Technology advancement demands greater adaptability; however, older fishermen frequently encounter challenges in acquiring and applying new technological tools (Kobesi et al., 2019). The decline in productivity and health among aging fishermen can adversely affect their income and, consequently, their household welfare (Zakaria et al., 2022).

Several sub-sectors within the fisheries industry still offer significant growth potential, one of which is aquaculture (Adelodun, 2015). Aquaculture plays a crucial role in enhancing local food security production and increasing export revenue (Ariff & Nursalwani, 2021). Aquaculture production has experienced significant growth in recent years, driven by increasing market demand for shellfish, shrimp, and fish (Azra et al., 2021). According to Guenard (2020), the total food consumption of fish is projected to increase in 2030 compared to 2018, with significant growth expected in Latin America (33%), Africa (27%), Oceania (22%), and Asia (19%). The growing demand for more sustainable marine protein sources has fueled consumer interest in aquaculture products (Boyd et al., 2020). Growing consumer demand needs to be complemented by a corresponding enthusiasm among aquaculture producers, especially the younger generation or the youth, to actively engage in and further develop the aquaculture sector.

The coastal potential of Pamekasan Regency lies in its fishery production, with one notable example being the cultivation of hybrid grouper (*kerapu cantang*). According to data from the East Java Provincial Department of Marine Affairs and Fisheries in 2018, Pamekasan Regency contributed 21% of the Madura region's total fishery production volume (Bolkiah et al., 2021). Grouper is currently considered a promising fishery commodity with strong domestic and international market potential. It is also known for its relatively high market value (Syahputri et al., 2021). Hybrid grouper farming is expected to help Pamekasan Regency's economy, particularly for the people of Lembung Village in Galis District.

Studies on the interest of the younger generation in the agricultural sector have produced varied results. Afista et al. (2021) and Rosliana et al. (2021) stated that the younger generation is highly

interested in pursuing careers in the agricultural sector is high. Subsequently, Sophan et al. (2022) concluded that the younger generation's interest falls within the moderate category. On the other hand, the study conducted by Marza et al. (2020) indicated that the interest of the younger generation is categorized as low.

Many studies have been conducted regarding the factors that influence the younger generation's interest. Sophan et al. (2022) found that gender, education, frequency of helping parents, type of work, economic condition, family land size, and alternative job opportunities significantly influence the interest of the younger generation. Previously, Afista et al. (2021) stated that family land size and parents' income have a significant influence, whereas farmers' education and parents' occupation do not have a significant effect. Widayanti et al. (2021) showed that gender, motivation, inheritance, perception of agriculture, and community environment have a significant influence, whereas experience, education, income, and land size do not have a significant effect. Purnamasari et al. (2024) found that the younger generation's interest in working in the aquaculture sector is significantly influenced by income, business risk, and work comfort, whereas social status and family environment do not have a significant effect.

Although various studies have been conducted, several gaps remain that need to be addressed. First, there are conflicting results concerning the impact of parental education and occupation, which calls for further investigation. Second, despite the importance of this sector, research focusing specifically on the youth's interest in the aquaculture sector remains limited. Therefore, further research is needed to determine the key factors that consistently influence the willingness of youth to participate in aquaculture activities. Based on the outlined background, this study aims to examine the level of interest among youth in hybrid grouper farming, and identify the factors affecting their interest in grouper farming in Lembung Village, Galis District, Pamekasan Regency.

METHOD

This study was conducted from August to November 2024. The research location was purposively selected in Lembung Village, Galis District, Pamekasan Regency. This location was chosen based on the designation of Lembung Village as a center for the development of hybrid grouper (*kerapu cantang*) aquaculture. The study population consisted of residents in the research area who fall within the youth category. Based on Law No. 40 of 2009 regarding Youth, young people are defined as those between the ages of 16 and 30 years old.

This study employed 30 respondents, which is considered sufficient to meet the minimum sample size required for statistical testing. According to Cohen et al. (2007), larger sample sizes generally lead to more reliable research outcomes. However, there is a minimum threshold of 30 samples that must be met by researchers. Purposive sampling, a non-random sampling technique in which participants are chosen based on specific criteria, was used to select respondents. In this study, the age of the respondents served as the primary criterion for selection (Maharani & Bernard, 2018).

This study utilized primary data collected through two main techniques: interviews and observation. Observations were conducted on-site to monitor the activities of young individuals, particularly those related to hybrid grouper aquaculture. Structured interviews were conducted using a questionnaire. Data analysis techniques employed both quantitative descriptive and multiple linear regression analyses. Quantitative descriptive analysis was used to assess the level of youth interest in grouper aquaculture, utilizing a Likert scale and class interval approach. In this study, the Likert scale assigned scores as follows: strongly agree = 4, agree = 3, disagree = 2, and strongly disagree = 1. The total scores from the Likert responses were then categorized into five levels using class intervals: very low, low, moderate, high, and very high (Kusumaningrum & Rahmawati, 2021). The class interval was determined through the following calculations:

Highest score = 120
Lowest score = 30
Range = Highest score – Lowest score
= 120 – 30
= 90
Interval = Range / Number of categories
= 90/5
= 18

Thus, the class intervals and their corresponding categories are presented in Table 1.

Table 1. Class Intervals and Categories

Class Interval	Category
30 – 47	Very Low
48 – 65	Low
66 – 83	Moderate
84 – 101	High
102 – 120	Very High

Source: Data Processed, 2024

In addition to quantitative descriptive analysis, this study also employs multiple linear regression analysis to identify the factors influencing the interest of the younger generation in hybrid grouper farming. The functional equation for this analysis is expressed in equation 1.

$$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + e \quad (1)$$

Where:
Y = The Interest of the youth in hybrid grouper farming
X_1 = Education (Years)
X_2 = Risk
X_3 = Experience in Aquaculture (Years)
X_4 = Access to Non-Aquaculture Employment
X_5 = Parent's Occupation (1 = Aquaculture Farmer; 0 = Non-Aquaculture Farmer)
X_6 = Motivation
β_0 = Intercept/Constant
β_1- β_6 = The coefficients for the independent variables
e = *error term*

RESULT AND DISCUSSION

The Interest of the Younger Generation in Hybrid Grouper Farming

The results of the study indicate that 50% of the youth demonstrates a low level of interest in grouper aquaculture. Table 2 presents the distribution of youth interest levels. This low level of interest is largely due to young people's limited access to capital in the study area. In addition, some youths prefer not to engage in the fisheries sector. Furthermore, as most of their parents work as salt farmers, there is a strong expectation that their children will continue the family business of salt farming.

Table 2. Frequency of Youth Interest in Grouper Aquaculture

Category	Number (People)	Percentage (%)
Very Low	1	3.33
Low	15	50.00
Moderate	7	23.33
High	5	16.67
Very High	2	6.67
Total	**30**	**100.00**

Source: Data Processed, 2024

When examined for each indicator, one indicator falls into the low category, while the remaining four are categorized as moderate. Table 3 presents a detailed presentation of the scores and categories for each indicator. The indicator related to the opportunity to start grouper aquaculture in the near future (Indicator 3) received a low score. This result indicates that the younger generation perceives limited opportunities or inadequate facilities and infrastructure to initiate grouper aquaculture in the foreseeable future. Mulyani et al. (2021) stated that the primary objective of fish farmers in managing their businesses is to achieve maximum profit. Therefore, the availability of adequate facilities and supporting infrastructure is essential to meet the growth and development needs of cultured fish.

The indicator of interest in grouper aquaculture (Indicator 1) falls into the moderate category. This score suggests that most young people show a fair level of interest in grouper aquaculture. Similarly, the indicator reflecting the willingness to be involved in grouper aquaculture (Indicator 2) also received a moderate score, indicating a reasonably strong desire among youth to participate directly in grouper farming activities. The indicator assessing confidence that grouper aquaculture can ensure a secure future (Indicator 4) likewise falls within the moderate range. This indicates that the younger generation has a moderate level of confidence in the stability and sustainability of grouper (kerapu cantang) aquaculture. The indicator related to commitment to grouper farming (Indicator 5) also falls into the moderate category. This finding suggests that despite relatively low levels of interest and willingness, there is still a desire to remain committed if supportive opportunities are available. While various challenges and obstacles may be encountered, the hybrid grouper possesses considerable market potential and economic value (Palupi et al., 2020; Trianzah & Adi, 2023). These factors can play a crucial role in encouraging the participation and investment of youth in hybrid grouper aquaculture.

Table 3. The Level of Young Generation's Interest in Hybrid Grouper Farming

No.	Indicator	Acquired Score	Category
1	Interest in Hybrid Grouper Aquaculture	74	Moderate
2	Willingness to Engage in Hybrid Grouper Aquaculture	73	Moderate
3	Perceived Opportunity to Start Hybrid Grouper Aquaculture in the Near Future	49	Low
4	Belief that Hybrid Grouper Aquaculture Can Ensure a Secure Future	76	Moderate
5	Commitment to Hybrid Grouper Aquaculture	78	Moderate
	Total Score	**350**	**Moderate**

Source: Data Processed, 2024

Overall, it can be concluded that the level of interest among the younger generation in grouper aquaculture activities in Lembung Village, Galis District, Pamekasan Regency falls into the moderate category. It can be assumed that the younger generation shows a degree of enthusiasm for engaging in or pursuing hybrid grouper aquaculture. However, the youth face various challenges or obstacles—both

internal and external—that have contributed to the decline in their level of interest. Consistent with this result, Rahayu et al. (2023) found that although the youth hold a highly favorable perception of grouper aquaculture, their actual participation in the sector remains limited. The gap between the youth's positive perception of grouper aquaculture and their actual level of involvement in aquaculture activities is partly attributed to the high rate of migration among rural youth to urban areas in search of alternative employment opportunities (Maihani et al., 2021).

The moderate level of interest among the younger generation indicates considerable potential for enhancing the involvement of the youth in hybrid grouper aquaculture in Lembung Village. However, challenges stemming from both internal and external factors must be promptly addressed. The divergence in findings from those of Rahayu et al. (2023) suggests that local conditions — such as social support, infrastructure, and government policy — play a significant role in shaping youth interest in aquaculture. Strong collaboration between the government, local communities, and industry stakeholders is crucial to fostering a supportive environment that can stimulate and sustain greater youth participation in cantang grouper aquaculture in the village.

According to Afande et al. (2015), the low level of fishery production has contributed to the limited participation of youth in fishery activities. This situation has weakened efforts to boost fishery production and to ensure sustainable food security for an increasingly growing population. A major issue in fisheries development programs is the government has limited success in engaging youth in the various initiatives that have been implemented. Thus, government intervention is needed to foster youth interest in the fisheries sector. The government has the capacity to effectively formulate and implement appropriate policies (Nadarajah & Flaaten, 2017).

Access to capital plays a crucial role in the development of a business (Davies et al., 2019). However, many young people face difficulties in obtaining financing from financial institutions due to the lack of collateral required by creditors. The absence of collateral is often a primary barrier that prevents rural youth from securing funding (Afande et al., 2015). In their study, Dimelu et al. (2020) highlight that government support aimed at encouraging and enhancing youth participation, interest, and engagement can take several forms, such as providing interest-free and collateral-free loans, promoting youth involvement in social organizations, and offering platforms to educate farmers on the importance of further diversification in their livelihood strategies.

To enhance youth interest in hybrid grouper aquaculture in Lembung Village, government support can be implemented through skill development programs, improved access to capital, and sustained business mentoring. Moreover, raising awareness about the economic potential and long-term viability of hybrid grouper farming is essential for fostering motivation among the younger generation. The findings of Dimelu et al. (2020) indicated that well-designed government interventions can effectively stimulate youth participation in the fisheries sector. Based on these insights, the local government of Pamekasan could consider adopting similar strategies to develop tailored programs that encourage greater youth involvement in aquaculture.

Factors Influencing Youth Interest

Prior to performing multiple linear regression analysis, classical assumption tests are conducted to ensure the model's feasibility. The normality test, using the Kolmogorov-Smirnov test, indicates that the data points are aligned with and clustered around the diagonal line, implying that the data are normally distributed. The heteroscedasticity test reveals that all independent variables have significance values greater than 0.05, indicating that the model is free from heteroscedasticity. Furthermore, the multicollinearity test shows that all independent variables have tolerance values above 0.1 and Variance Inflation Factor (VIF) values below 10, indicating no evidence of multicollinearity. As all classical assumptions are met, the multiple linear regression analysis can be conducted.

The factors influencing youth interest in hybrid grouper aquaculture in Lembung Village, Galis District, Pamekasan Regency were analyzed using the model specified in Equation (1). In the multiple linear regression model, the dependent variable is youth interest. The independent variables included in the model are education, business risk, aquaculture experience, a dummy variable for access to non-fisheries employment, a dummy variable for parents' occupation, and a dummy variable for motivation. Table 4 presents the estimation results of the factors affecting the interest of youth in hybrid grouper aquaculture in Lembung Village, Galis District, Pamekasan Regency.

Table 4. Result of the Multiple Regression Analysis

No.	Variable	Coefficient	t-value	Sig.
1	Constant	-0.627	-0.129	0.899
2	X1 = Education	0.189	0.812	0.425
3	X2 = Business Risk	0.398	1.389	0.178
4	X3 = Aquaculture Experience	-0.088	-0.262	0.796
5	X4 = Access to Non-Fisheries Employment	-0.103	-0.295	0.770
6	X5 = Parents' Occupation	0.183	0.162	0.872
7	X6 = Motivation	0.704	5.323*	0.000*
8	F-value	7.590		
9	Adjusted R-Square	0.577		

Source: Data Processed, 2024

Note :

* : significant at the α 5% (t-statistics = 2.045)

Based on the results of the regression analysis, the regression equation model obtained from this study is as follows:

$$Y = -0.627 + (0.189)X_1 + (0.398)X_2 – (0.088)X_3 – (0.103)X_4 + (0.183)X_5 + (0.704)X_6$$

The constant coefficient of -0.627 implies that the younger generation's level of interest in engaging in hybrid grouper aquaculture is expected to decrease by 0.627 when all independent variables are held at zero. The Adjusted R Square (Adjusted R^2) value of 0.577 indicates that approximately 57.7% of the variability in the dependent variable (youth interest in hybrid grouper aquaculture) is accounted for by variations in the six independent variables: education (X_1), business risk (X_2), aquaculture experience (X_3), access to non-fisheries employment opportunities (X_4), parents' occupation (X_5), and motivation (X_6). The remaining 42.3% is explained by factors not included in the model. Furthermore, the results of the F-test reveal that the calculated F-value exceeds the critical F-statistics (7.59 > 2.55) and the significance level is below the 0.05 threshold (0.000 < 0.05), indicating that the independent variables collectively have a statistically significant influence on the dependent variable.

Based on the results of the t-test analysis, only one variable was found to have a statistically significant influence on the interest of the younger generation in hybrid grouper aquaculture, namely the motivation variable, among the six independent variables examined. The regression coefficient for the motivation variable was positive at 0.704, indicating that higher levels of motivation are associated with a greater interest in engaging in hybrid grouper aquaculture. The significance value for the motivation variable was 0.000, which is below the predetermined significance level of 0.05. Furthermore, the results of the t-test showed that the calculated t-value (5.323) exceeded the critical t-statistics (2.045) at a 95% confidence level. These findings indicate that motivation has a positive and

statistically significant effect on the younger generation's interest in pursuing hybrid grouper aquaculture in Lembung Village, Galis District, Pamekasan Regency.

These findings are supported by Widayanti et al. (2021) which stated that the level of motivation has a positive and significant influence on the millennial generation's interest in continuing family farming. Motivation can be understood as a set of efforts to create specific conditions that encourage individuals to engage in certain action (Triansari, 2019). Motivation may stem from both internal and external factors. Internal factors include the desire to generate substantial profit and to improve the family's economic condition compared to previous generations. A portion of the younger generation, whose parents are engaged in aquaculture, perceive fish farming as a family tradition that should be continued, as this profession is often inherited across generations (Purnamasari et al., 2024). According to Haggblade et al. (2015), individuals raised in agricultural environment tend to have a strong desire to devote their careers to enhancing productivity in the agricultural sector, with the broader aim of contributing to the welfare of rural communities where they were raised. This phenomenon is unsurprising, given that their parents often serve as role models (Mabe et al., 2020).

Most of the youth in Lembung Village have less than five years of experience in fish aquaculture, which is an average of 1.8 years. Fish aquaculture activities have traditionally been carried out by salt farmers in Lembung Village. As example, milkfish aquaculture is commonly practiced by some salt farmers during the rainy season, as salt production becomes unfeasible during this period. In addition to milkfish, one of the youths reported having seven years of experience in snapper farming, which has contributed to a high level of interest in hybrid grouper farming. This person states that hybrid grouper farming uses techniques similar to snapper farming. However, there remains a need for extension services and access to information regarding hybrid grouper aquaculture. Uddin et al. (2021) mentioned that fish farmers with greater farming experience tend to encounter fewer production related problems.

The majority (66.67%) of youth in Lembung Village have completed education up to the senior high school. However, education in the research area did not have a significant impact on youth interest in hybrid grouper aquaculture. Higher levels of education among youth do not necessarily translate into stronger motivation to engage in hybrid grouper farming. Uddin et al., (2021) state that education broadens the perspectives and insights of fish farmers, equipping them to better address potential challenges. Education plays a critical role in facilitating access to information and can assist in exploring various solutions when resolving constraints. Kabir et al. (2022) similarly argue that increased knowledge of aquaculture improves farmers' ability to evaluate business risks and market opportunities. Nonetheless, some findings indicate that higher levels of education, particularly among youth, are associated with a declining interest in agricultural employment. There is a general trend wherein more educated young individuals prefer careers outside the agricultural sector, which is often perceived to offer better income prospects. (Henning et al., 2022; Msangi et al., 2024; Perdana & Widodo, 2022; Widayanti et al., 2021; Yeboah et al., 2019).

Youth participation in the fisheries sector is vital for economic growth and poverty reduction, but the urgency and challenges associated with the involvement of rural youth in fisheries are often underappreciated in many developing (Ouko et al., 2022). The Madurese population is known for its high rate of labor migration, particularly in search of employment opportunities beyond the agricultural and fisheries sectors. Demographically, most migrants from Madura are aged between 20 and 29. This elevated level of mobility among young people reflects two critical life transitions: the formation of families through marriage and the pursuit of career advancement or job opportunities (Ramadhany, 2021). Bezu & Holden (2014) observed that only a small fraction (9%) of rural youth identified agriculture as their preferred future livelihood, with the vast majority opting for non-agricultural occupations, entrepreneurship, or urban employment.

External factors contributing to youth motivation include family support, access to capital, and the availability of adequate infrastructure and facilities. Government assistance programs—such as training, extension services, and financial aid—also have the potential to enhance young people's motivation to engage in aquaculture. In Lembung Village, however, most youth reported a lack of familial support. This situation largely stems from limited household financial capacity and the perceived risks associated with hybrid grouper farming. The youth in Lembung Village expressed that the primary challenge they face is securing capital to start or expand their business, thus emphasizing the need for government intervention, particularly in terms of financial assistance. Insufficient start-up capital is a significant barrier to youth involvement in agribusiness (Mulema et al., 2021). Despite this, youth in Lembung are generally not deterred by potential risks, they are rather motivated by the challenge of managing those risks. This observation is consistent with Purnamasari et al. (2024), who stated that a high tolerance for risk is a key component influencing entrepreneurial interest.

Hybrid grouper aquaculture requires advanced technology and substantial capital investment, and the potential financial losses in the event of production failure are also significant, therefore adopting a partnership scheme to implement this aquaculture enterprise through a partnership scheme would be highly advantageous (Sholihah, 2016). The presence of farming group serves not only as a platform for exchanging information and experiences but also as a means of fostering collaboration among fish farmers. At present, hybrid grouper farming is considered a promising venture with the potential to generate high revenue. The limited supply of grouper in the market contributes to the commodity's relatively stable price (Abubakar, 2018). The high market value of hybrid grouper is one of the key factors that can encourage youth to engage in its aquaculture. With Lembung Village positioned as center for the development of hybrid grouper aquaculture in Pamekasan Regency, the active participation and contribution of youth are vital to the success of this initiative.

CONCLUSIONS

This study aimed to examine the level of interest among the younger generation in hybrid grouper aquaculture in Lembung Village, Galis District, Pamekasan Regency and to identify the factors influencing that interest**.** The findings indicate that the overall youth interest falls within the moderate category. While many young people show enthusiasm, their participation is constrained by challenges such as limited access to capital, insufficient infrastructure, and a tendency to pursue alternative non-fisheries occupations. Of the six factors analyzed—education, business risk, aquaculture experience, access to non-fisheries employment, parents' occupation, and motivation—only motivation was found to have a positive and significant effect on youth interest. This highlights that motivation, both internal (e.g., economic improvement, family legacy) and external (e.g., government support, infrastructure availability), is the main driver of youth engagement.

To strengthen and expand their involvement in this sector, coordinated efforts between the government and local communities are required. Government support may include training programs, extension services, and improved capital access. In addition, strengthening farmer groups to mentor and share experiences with the younger generation is essential to fostering sustained interest and participation.

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